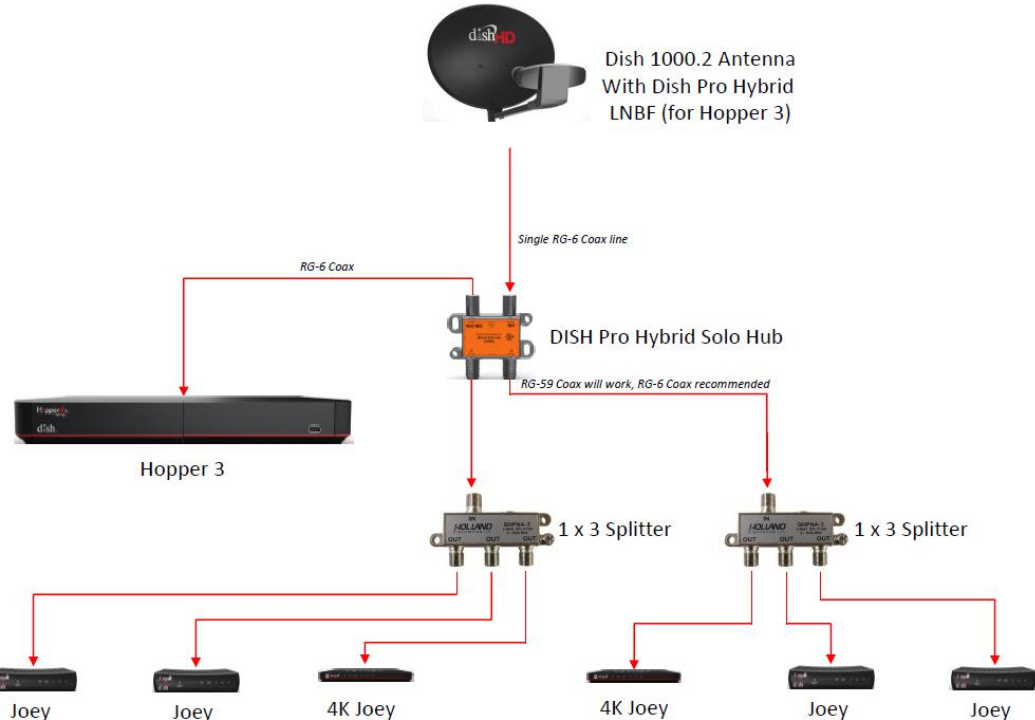# EXHIBIT R

U.S. Patent No. 10,432,422 ("the '422 Patent") Exemplary Infringement Chart

The Accused MoCA Instrumentalities are instrumentalities that DISH deploys to provide a whole-premises DVR network over an on-premises coaxial cable network, with DISH "Hopper" and "Joey" nodes operating with data connections compliant with MoCA 1.0, 1.1, and/or 2.0. The Accused MoCA Instrumentalities include the DISH Hopper, DISH Hopper with Sling, DISH Hopper DUO, DISH Joey, DISH Joey 2, and DISH Super Joey, DISH Hopper 3, DISH 4K Joey, and DISH Joey 3, and substantially similar instrumentalities. DISH literally and/or under the doctrine of equivalents infringes the claims of the '422 Patent under 35 U.S.C. § 271(a) by making, using, selling, offering for sale, and/or importing the Accused MoCA Instrumentalities.

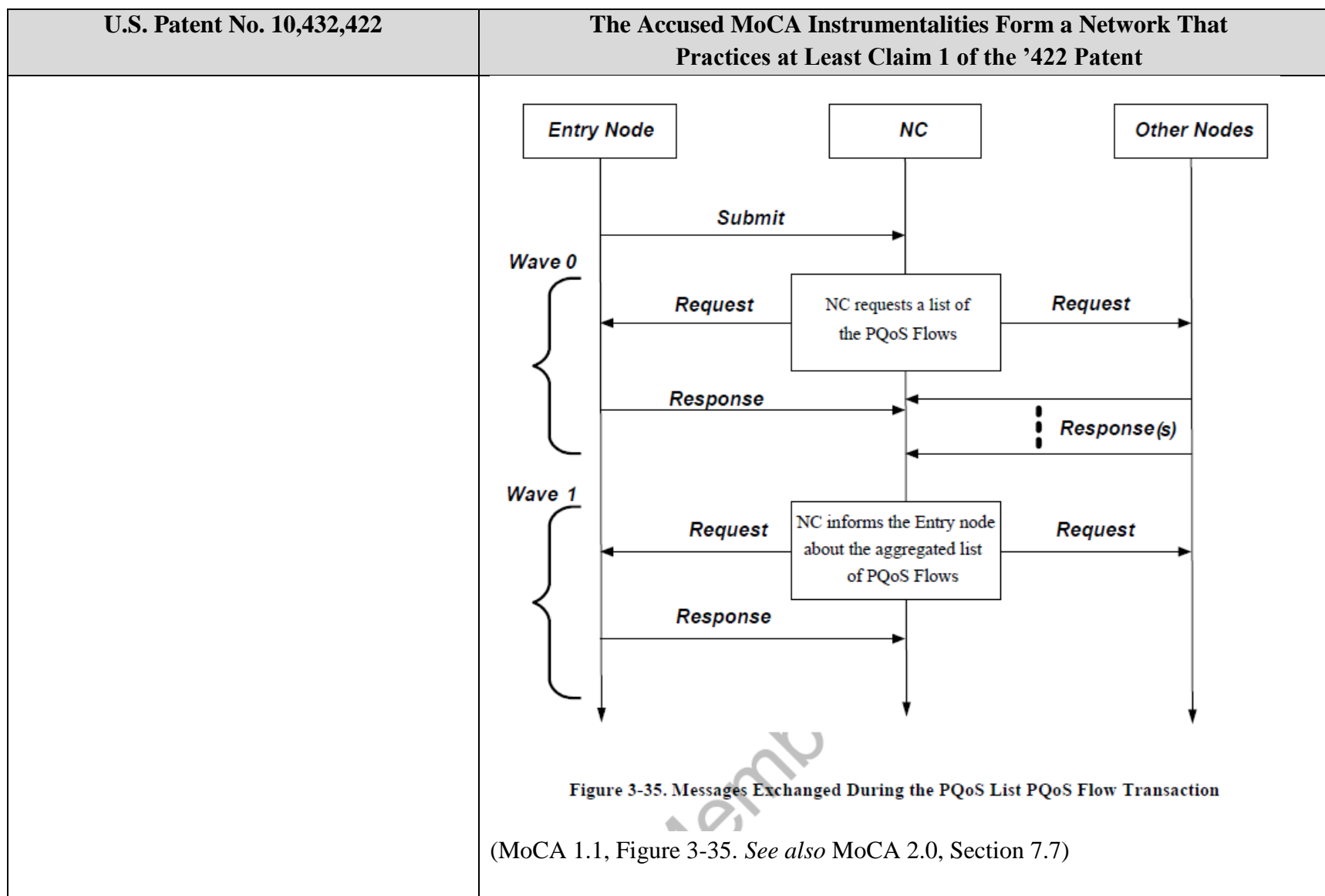| U.S. Patent No. 10,432,422	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the '422 Patent
1. A communication network comprising:	The Accused Services are provided using at least the Accused MoCA Instrumentalities including the DISH Hopper, DISH Hopper with Sling, DISH Hopper DUO, DISH Joey, DISH Joey 2, DISH Super Joey, DISH Hopper 3, DISH 4K Joey, and DISH Joey 3, and devices that operate in a similar manner. The Accused MoCA Instrumentalities operate to form a data communication network over an on-premises coaxial cable network as described below. The DISH full-premises DVR network constitutes a data communication network as claimed. The DISH full-premises DVR network is a MoCA network created between at least one Hopper DVR and one or more Joey receivers using the on-premises coaxial cable network. This MoCA network is compliant with MoCA 1.0, 1.1, and/or 2.0. "The MoCA system network model creates a coax network which supports communications between a convergence layer in one MoCA node to the corresponding convergence layer in another MoCA node." (MoCA 1.1, Section 1.1. *See also* MoCA 2.0, Section 1.2.2)

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	"The MoCA Network transmits high speed multimedia data over the in-home coaxial cable infrastructure." (MoCA 1.1, Section 2. *See also* MoCA 2.0, Section 5) DISH utilizes the MoCA standard to provide an on-premises DVR network over an on-premises coaxial cable network as described below: DISH PRO HYBRID SOLO HUB: This Solo Hub is a home video network device that combines multi-orbital coaxial cable satellite feeds from a DISH 1000.2

U.S. Patent No. 10,432,422	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the '422 Patent
	antenna or switch into a single-cable coaxial satellite feed to support MoCA networking for the Hopper 3 DVRs (host). The client ports are intended to feed up to 6 Joey client receivers (clients). The Solo Hub creates a MoCA video network for Hopper DVRs and Joeys. Rated 50 MHz to 3 GHz. SPLITTERS: 1 GHz common splitters can be used to feed Joey client receivers. HOPPER 3: The Hopper 3 is the revolutionary whole-home DVR from DISH that includes 16 satellite tuners and a 2TB hard drive. JOEY: The Joey is the MoCA thin-client receiver that networks with the Hopper for viewing on additional TVs. 4K JOEY: The 4K Joey is an option for installation on additional 4K TVs. DISH PRO HYBRID 42 SWITCH: This switch allows two Hopper 3 DVRs to be installed using a single DISH traditional 1000.2 antenna. Each Hopper 3 forms its own MoCA video network with connected Joeys. The switch comes with a 110VAC power supply unit.

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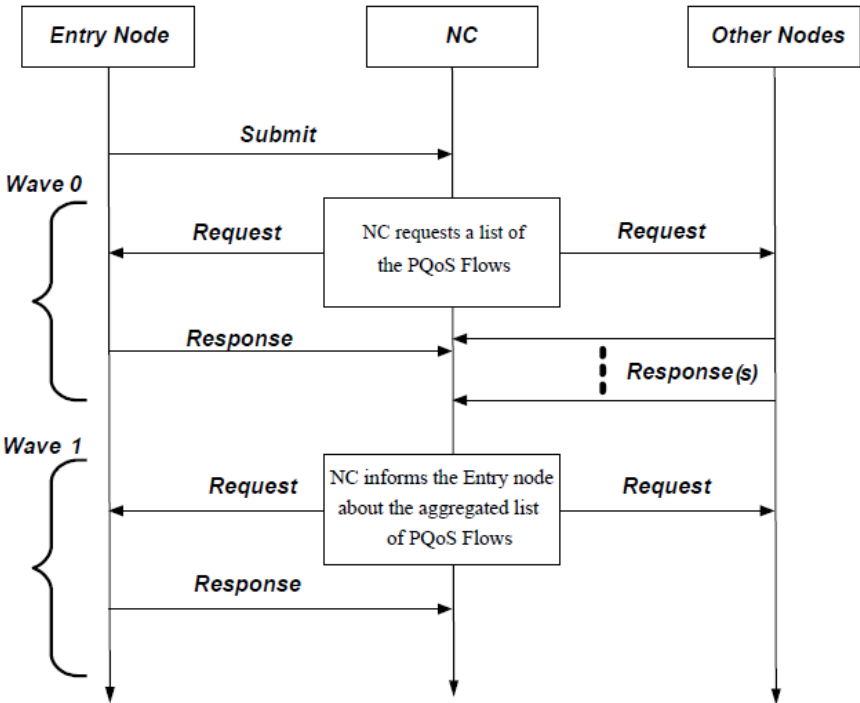| U.S. Patent No. 10,432,422	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the '422 Patent
	Your new Hopper® 3 receiver is a Whole-Home HD DVR that offers full digital video recording functionality, including pausing live TV, to every TV in your house that is part of your Whole-Home DVR system. The Hopper 3 receiver is the hub for all things entertainment. It is an HD DVR that provides the equivalent of 16 tuners, allowing you to record multiple HD channels at once and at any time and play them back in any room in your home. Using the PrimeTime Anytime® feature, you can record up to six HD channels simultaneously (with your local ABC, CBS, FOX and NBC channels provided in HD, which may not be available in all markets). It is one HD DVR that works independently on as many as four different TVs at the same time, so everyone can be in different room watching their favorite TV programming. Joey® receivers (Joey®, SuperJoey®, Wireless Joey®, 4K Joey™) connect to other TVs in your home and link to the Hopper 3 system, creating a Whole-Home DVR network. It supports all of the features of the Hopper 3 (with the exception of Picture-In-Picture) and offers an identical user interface as the Hopper 3. You can connect a Joey receiver to a high-definition or standard-definition TV.

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	CONNECTING THE JOEY RECEIVER(S)
	
	This section describes how to connect the receiver's HOME VIDEO NETWORK connection to one or more cable-ready remote TV(s) located in other room(s) away from the Hopper. You can use these instructions to connect TVs in your home to see live and recorded programming from the Hopper. This installation uses your in-home coaxial cable system. If your home does not have built-in cabling, it will be necessary to run these cables from the Hopper HD DVR to each Joey Receiver conected to a remote TV. Due to the potential complexity of this installation, you should have this professionally installed. Call the DISH Customer Service Center at 1-800-333-DISH (3474) for more information.
	
	If you need another remote control, be sure to order the replacement remote control kit for Hopper and Joey that uses UHF-2G signals. Call your DISH retailer, or visit www.mydish.com online, select Upgrades, then Products, and click on Remote & Accessories.
	
	1 Connect the HOME VIDEO NETWORK output on the back of the Hopper HD DVR to an existing wall cable outlet using a coaxial cable.
	
	2 Connect the Joey Receiver(s) in other room(s) to existing wall cable outlet(s) using coaxial cable(s).
	
	3 Connect the Joey Receiver(s) to an audio/video input of the remote TV in each room.
	
	  • If it is a high-definition TV or monitor and an HDMI connection is available on the remote TV, use a single HDMI cable from the output on the back of the Joey Receiver to provide high-quality audio and HD/SD video. See page 94.
	  • If it is a standard-definition TV or an HDMI connection is not available on the remote TV, use composite (yellow) video and stereo audio cables from the outputs on the back of the Joey Receiver. See page 95.
	
	4 Turn on every Joey Receiver and remote TV connected to the in-home cabling system. If you have not already done so, you may need to pair a remote control to each Joey.
	
	5 Follow the on-screen prompts or included instructions for linking each Joey Receiver to your Hopper HD DVR. (The Hopper is the host for DISH Whole-Home DVR services.)
	
	6 Confirm that you see a picture from your Joey Receiver(s) on your remote TV(s).
	
	  • If your picture looks good, then you are finished with this procedure.
	  • If your TVs do not display a picture or if the picture is not as clear as you would like it to be, repeat the steps to confirm all the connections. Coaxial connections should be hand-tightened.

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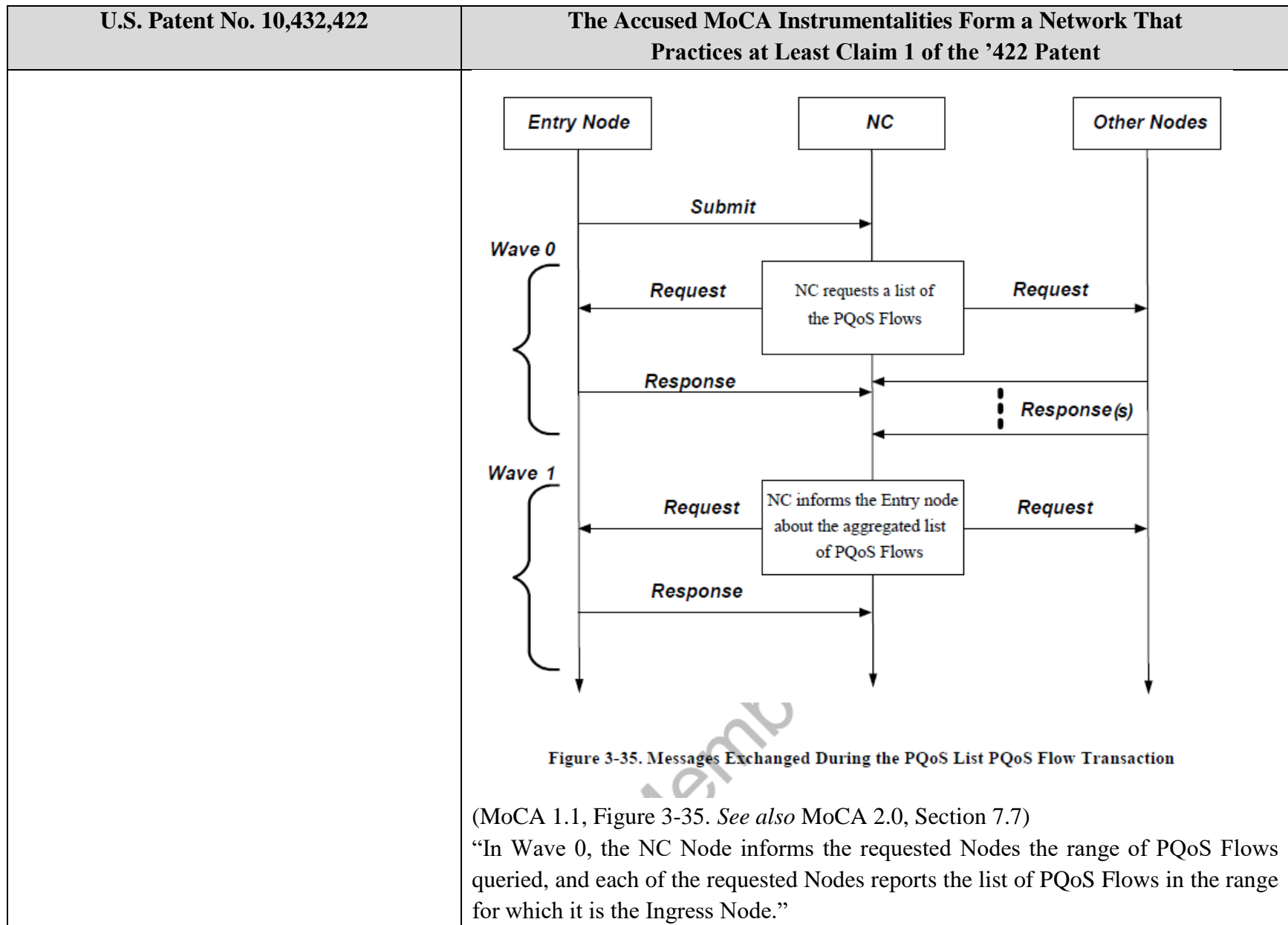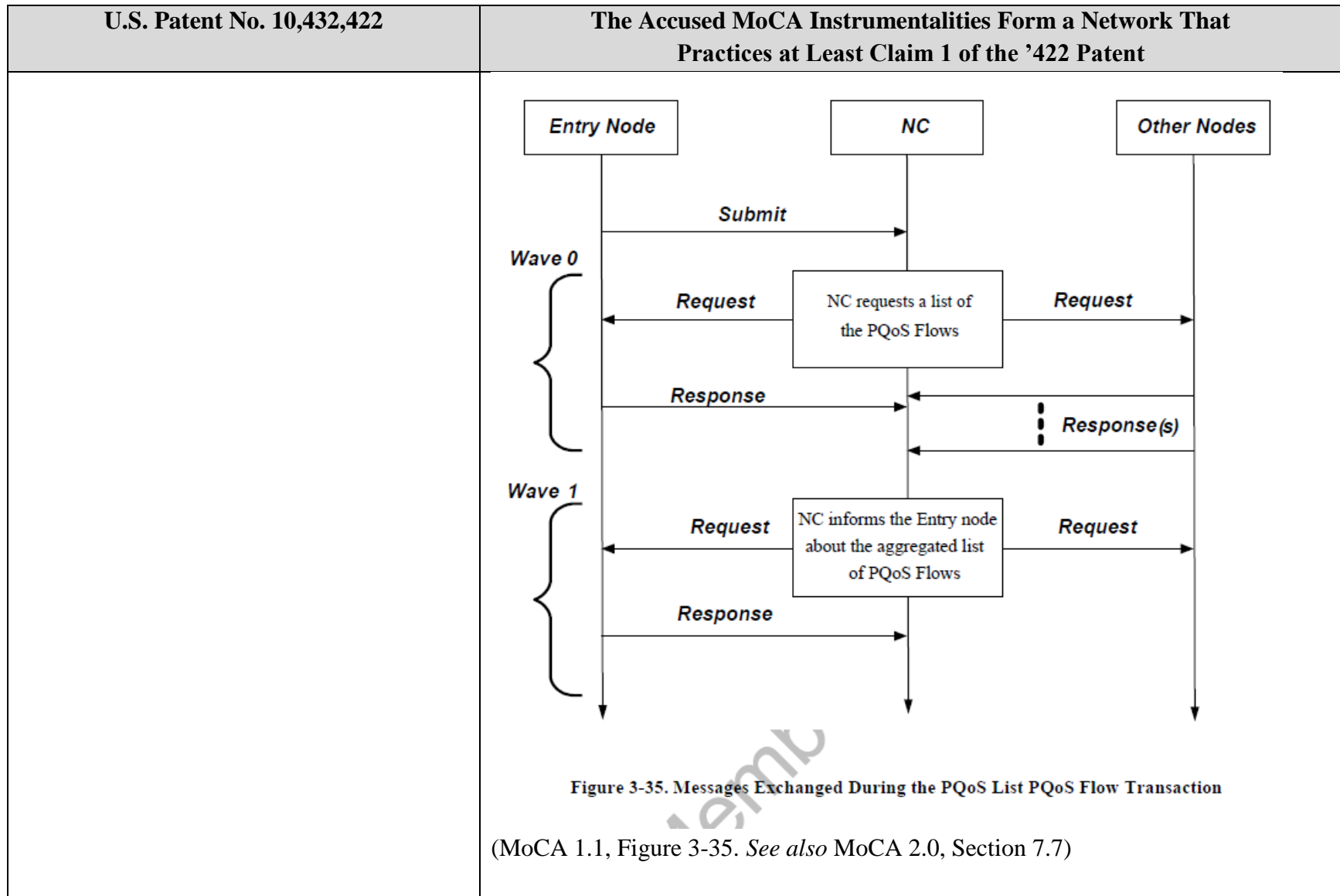| U.S. Patent No. 10,432,422	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the '422 Patent
a requesting node;	The Accused MoCA Instrumentalities operate as a requesting node as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules constituting a requesting node. "The purpose of the List PQoS Flow Transaction is to enable any Node to retrieve the list of PQoS flows in the MoCA Network." (MoCA 1.1, Section 3.17.5. *See also* MoCA 2.0, Section 7.7)

U.S. Patent No. 10,432,422	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the '422 Patent
	Figure 3-35. Messages Exchanged During the PQoS List PQoS Flow Transaction (MoCA 1.1, Figure 3-35. *See also* MoCA 2.0, Section 7.7)

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U.S. Patent No. 10,432,422	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the '422 Patent
	"Any Node can initiate the List PQoS Flow Transaction. The Transaction starts when the Entry Node sends a Submit L2ME Frame (explained in Section 3.15.2.3.1) to the NC Node." (MoCA 1.1, Section 3.17.5.1. *See also* MoCA 2.0, Section 7.7)
a Network Coordinator (NC) node; and	The Accused MoCA Instrumentalities operate as a Network Coordinator (NC) node as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules constituting a Network Coordinator (NC) node. "Network Coordinator (NC) – A MoCA node that performs the following salient functions in a MoCA Network: Beacon generation, MAP generation, admission of new MoCA nodes to the network, privacy key generation and distribution, and LMO scheduling." (MoCA 1.1, Section 1.2. *See also* MoCA 2.0, Section 3)

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	Figure 3-35. Messages Exchanged During the PQoS List PQoS Flow Transaction (MoCA 1.1, Figure 3-35. *See also* MoCA 2.0, Section 7.7)
a plurality of requested nodes, wherein:	The Accused MoCA Instrumentalities operate as a plurality of requested nodes as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules constituting a plurality of requested nodes.

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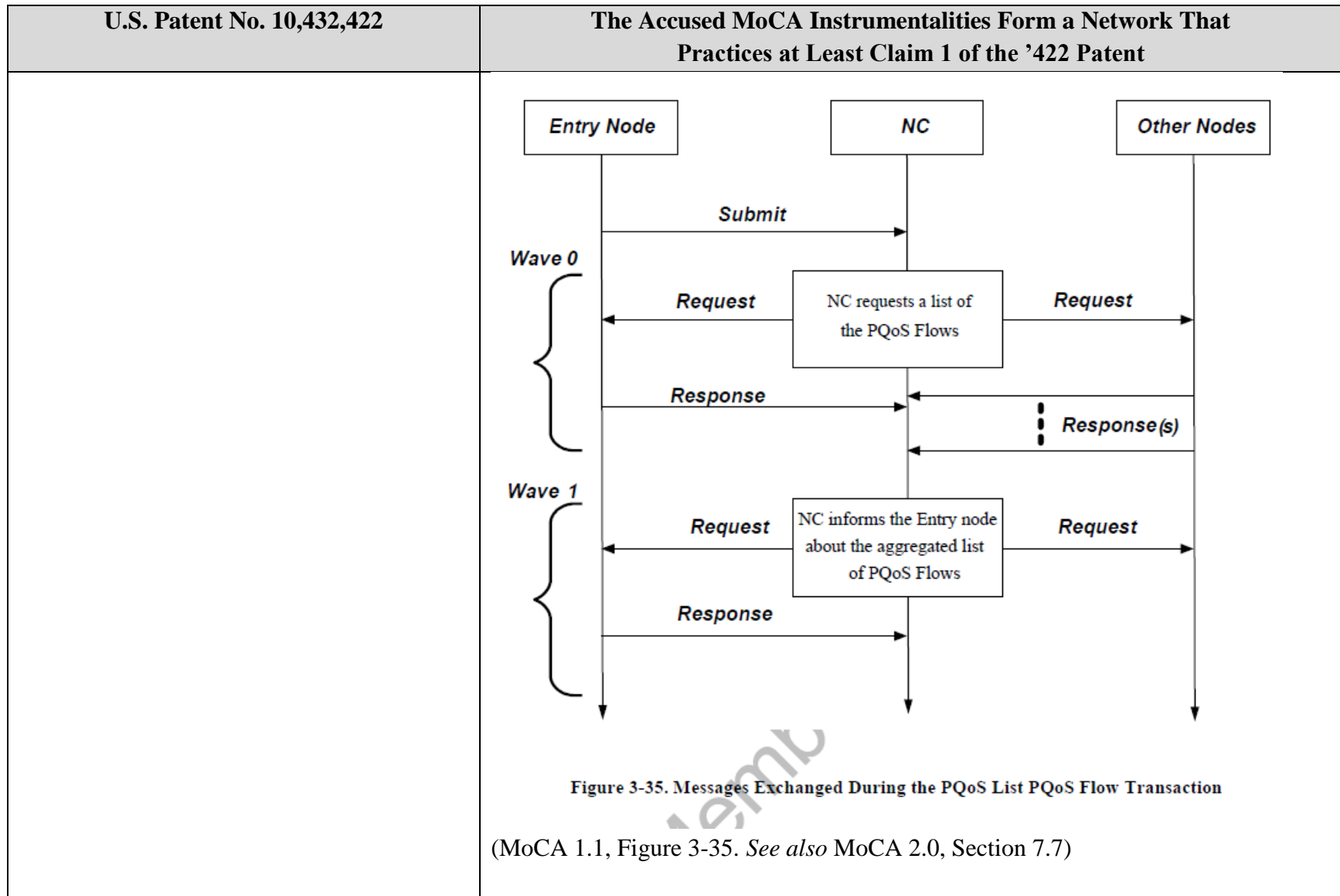| U.S. Patent No. 10,432,422	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the '422 Patent
	"The purpose of the List PQoS Flow Transaction is to enable any Node to retrieve the list of PQoS flows in the MoCA Network." (MoCA 1.1, Section 3.17.5. *See also* MoCA 2.0, Section 7.7)

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U.S. Patent No. 10,432,422	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the '422 Patent
	Figure 3-35. Messages Exchanged During the PQoS List PQoS Flow Transaction (MoCA 1.1, Figure 3-35. *See also* MoCA 2.0, Section 7.7) "In Wave 0, the NC Node informs the requested Nodes the range of PQoS Flows queried, and each of the requested Nodes reports the list of PQoS Flows in the range for which it is the Ingress Node."

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	(MoCA 1.1, Section 3.17.5.2. *See also* MoCA 2.0, Section 7.7)
the requesting node is operable to, at least, communicate a first message to the NC node requesting a list comprising parameterized quality of service (PQoS) flows of the communication network; and	The requesting node is operable to, at least, communicate a first message to the NC node requesting a list comprising parameterized quality of service (PQoS) flows of the communication network as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules operable to, at least, communicate a first message to the NC node requesting a list comprising parameterized quality of service (PQoS) flows of the communication network. "The PQoS Flow transactions for Nodes can be classified into two main groups as follows: […] Flow management PQoS transactions, which include […] List PQoS Flow transaction." (MoCA 1.1, Section 3.17.1. *See also* MoCA 2.0, Section 7.7) "The purpose of the List PQoS Flow Transaction is to enable any Node to retrieve the list of PQoS flows in the MoCA Network." (MoCA 1.1, Section 3.17.5. *See also* MoCA 2.0, Section 7.7)

U.S. Patent No. 10,432,422	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the '422 Patent
	Figure 3-35. Messages Exchanged During the PQoS List PQoS Flow Transaction (MoCA 1.1, Figure 3-35. *See also* MoCA 2.0, Section 7.7)

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U.S. Patent No. 10,432,422	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the '422 Patent
	"Any Node can initiate the List PQoS Flow Transaction. The Transaction starts when the Entry Node sends a Submit L2ME Frame (explained in Section 3.15.2.3.1) to the NC Node." (MoCA 1.1, Section 3.17.5.1. *See also* MoCA 2.0, Section 7.7)
the NC node is operable to, at least: receive the first message from the requesting node; and	The NC node is operable to, at least: receive the first message from the requesting node as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules operable to, at least: receive the first message from the requesting node. "The Transaction starts when the Entry Node sends a Submit L2ME Frame (explained in Section 3.15.2.3.1) to the NC Node." (MoCA 1.1, Section 3.17.5.1. *See also* MoCA 2.0, Section 7.7)
in response to the received first message: communicate a second message to each requested node of the plurality of requested nodes, the second message requesting from said each requested node a list identifying PQoS flows for which said each requested node is an ingress node;	The Accused MoCA Instrumentalities operate to, in response to the received first message: communicate a second message to each requested node of the plurality of requested nodes, the second message requesting from said each requested node a list identifying PQoS flows for which said each requested node is an ingress node as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that, in response to the received first message: communicate a second message to each requested node of the plurality of requested nodes, the second message requesting from said each requested node a list identifying PQoS flows for which said each requested node is an ingress node.

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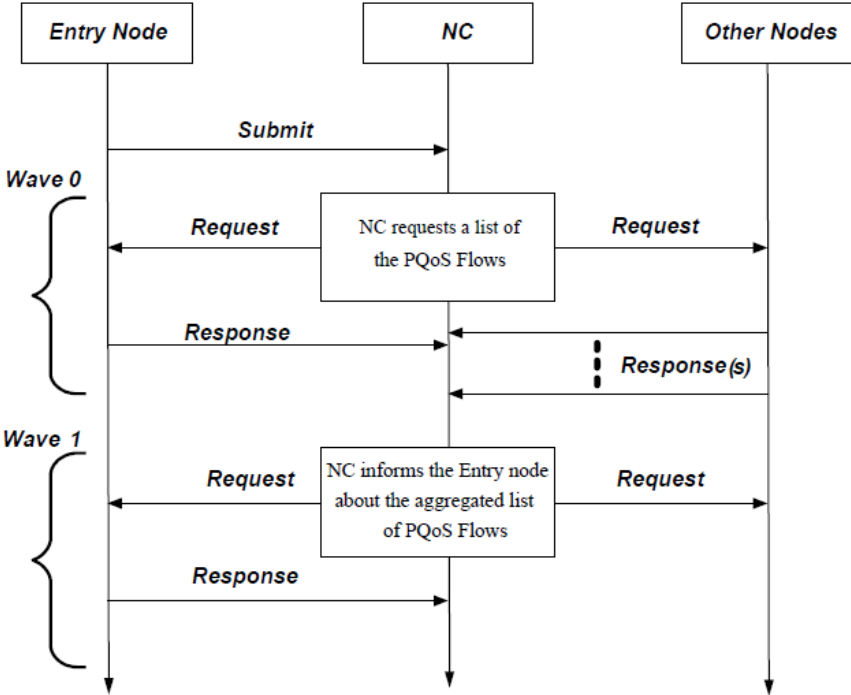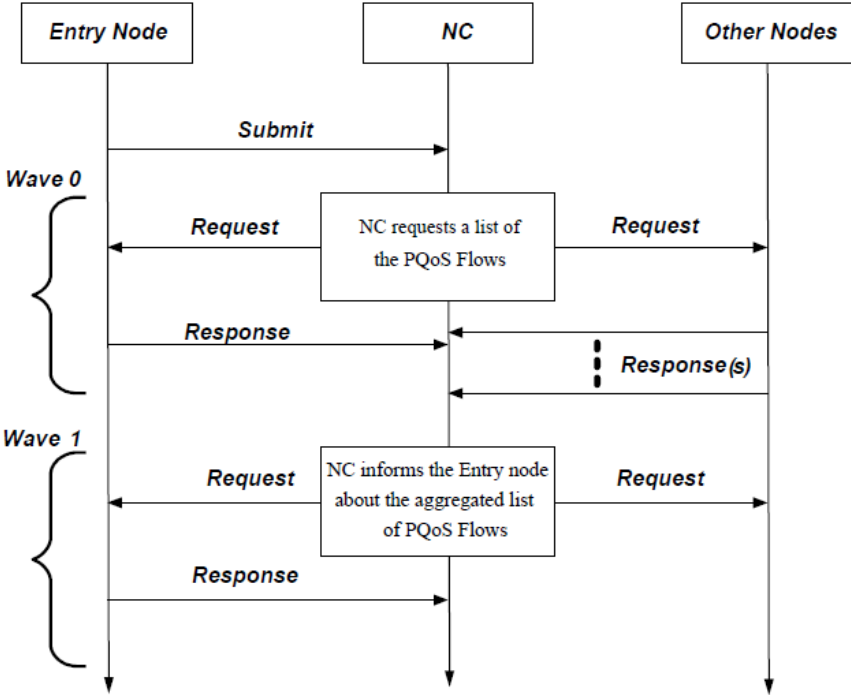| U.S. Patent No. 10,432,422	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the '422 Patent
	"In Wave 0, the NC Node informs the requested Nodes the range of PQoS Flows queried, and each of the requested Nodes reports the list of PQoS Flows in the range for which it is the Ingress Node." (MoCA 1.1, Section 3.17.5.2. *See also* MoCA 2.0, Section 7.7) "Each Node MUST maintain a logical table for information related to each PQoS Flow for which it is the Ingress Node. The entries in this logical table MUST be numbered contiguously from 0. The ordering of elements in this table only changes when value of FLOW_UPDATE_COUNT changes. Thus, the Entry Node can build up a complete list of information for PQoS Flows from an Ingress Node by selecting which entry in the Ingress Node's logical table to start the response list from." (MoCA 1.1, Section 3.17.5.1. *See also* MoCA 2.0, Section 7.7)

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U.S. Patent No. 10,432,422	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the '422 Patent
	Figure 3-35. Messages Exchanged During the PQoS List PQoS Flow Transaction (MoCA 1.1, Figure 3-35. *See also* MoCA 2.0, Section 7.7)

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receive, from said each requested node a respective third message comprising a list identifying PQoS flows for which said each requested node is an ingress node;	The Accused MoCA Instrumentalities operate to receive, from said each requested node a respective third message comprising a list identifying PQoS flows for which said each requested node is an ingress node as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that receive, from said each requested node a respective third message comprising a list identifying PQoS flows for which said each requested node is an ingress node. "The NC Node MUST initiate Wave 0 using Request L2ME Frame format (explained in Section 0) based on the Submit L2ME Frame format shown in Table 3-58 to the Node that MUST provide a Response." (MoCA 1.1, Section 3.17.5.2.1. *See also* MoCA 2.0, Section 7.7)) "The queried Node MUST respond with a Response L2ME Frame (format as explained in Section 3.15.2.3.3)." (MoCA 1.1, Section 3.17.5.2.2. *See also* MoCA 2.0, Section 7.7) "Each Node MUST maintain a logical table for information related to each PQoS Flow for which it is the Ingress Node. The entries in this logical table MUST be numbered contiguously from 0. The ordering of elements in this table only changes when value of FLOW_UPDATE_COUNT changes. Thus, the Entry Node can build up a complete list of information for PQoS Flows from an Ingress Node by selecting which entry in the Ingress Node's logical table to start the response list from." (MoCA 1.1, Section 3.17.5.1. *See also* MoCA 2.0, Section 7.7)

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	Table 3-59. L2ME_PAYLOAD of Response L2ME Frame Format for List PQoS Flow Transaction (Wave 0)
	
	Field / Length / Usage
	Response L2ME Payload for List PQoS Flow
	RESERVED — 24 bits — Type III
	FLOW UPDATE COUNT — 8 bits — The value of a counter that increments on the queried Node whenever the logical table of PQoS Flow IDs on that Node changes
	TOTAL FLOW ID COUNT — 32 bits — Total number of PQoS Flows for which this Node is the Ingress Node
	RETURNED FLOW IDs (up to 32 flow IDs)
	For (i=0; i<N; i++) { — — N = Number of returned flow IDs
	RETURNED FLOW ID — 48 bits — Returned PQoS Flow ID
	RESERVED — 16 bits — Type III
	}
	
	(MoCA 1.1, Table 3-59. *See also* MoCA 2.0, Section 7.7)
	
	"The RETURN FLOW ID field in the Response L2ME Payload for List PQoS Flow Transaction are arranged as a list, starting with FLOW_START_INDEX entry in the Node's logical table and with up to the maximum number of PQoS Flows as specified by FLOW_MAX_RETURN."
	(MoCA 1.1, Section 3.17.5.2.2. *See also* MoCA 2.0, Section 7.7)

form an aggregated list of PQoS flows comprising each respective list identifying PQoS flows from each received third message; and	The Accused MoCA Instrumentalities operate to form an aggregated list of PQoS flows comprising each respective list identifying PQoS flows from each received third message as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that form an aggregated list of PQoS flows comprising each respective list identifying PQoS flows from each received third message.

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U.S. Patent No. 10,432,422	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the '422 Patent
	"In Wave 1, the NC Node informs the Entry Node and interested Nodes about the aggregated list of PQoS flows found in Wave 0." (MoCA 1.1, Section 3.17.5.3. *See also* MoCA 2.0, Section 7.7) "The NC Node MUST initiate Wave 1 using Request Frame format with the concatenated responses from Wave 0. The format of a concatenated Request Frame is described in Section 3.15.2.3.2." (MoCA 1.1, Section 3.17.5.3.1. *See also* MoCA 2.0, Section 7.7) *See also* MoCA 1.1, Table 3-41; MoCA 2.0, Section 7.7.
communicate a fourth message to at least the requesting node comprising the aggregated list,	The Accused MoCA Instrumentalities operate to communicate a fourth message to at least the requesting node comprising the aggregated list as described below. For example, by virtue of their compliance with MoCA, the Accused MoCA Instrumentalities include circuitry and/or associated software modules that communicate a fourth message to at least the requesting node comprising the aggregated list. "In Wave 1, the NC Node informs the Entry Node and interested Nodes about the aggregated list of PQoS flows found in Wave 0." (MoCA 1.1, Section 3.17.5.3. *See also* MoCA 2.0, Section 7.7) "The NC Node MUST initiate Wave 1 using Request Frame format with the concatenated responses from Wave 0. The format of a concatenated Request Frame is described in Section 3.15.2.3.2." (MoCA 1.1, Section 3.17.5.3.1. *See also* MoCA 2.0, Section 7.7)

U.S. Patent No. 10,432,422	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the '422 Patent
	 Figure 3-35. Messages Exchanged During the PQoS List PQoS Flow Transaction (MoCA 1.1, Figure 3-35. *See also* MoCA 2.0, Section 7.7)
wherein the second message specifies a range of PQoS flows being queried.	The second message specifies a range of PQoS flows being queried as described below. For example, the second message specifies a range of PQoS flows being queried in compliance with MoCA.

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U.S. Patent No. 10,432,422	The Accused MoCA Instrumentalities Form a Network That Practices at Least Claim 1 of the '422 Patent
	"In Wave 0, the NC Node informs the requested Nodes the range of PQoS Flows queried, and each of the requested Nodes reports the list of PQoS Flows in the range for which it is the Ingress Node." (MoCA 1.1, Section 3.17.5.2. *See also* MoCA 2.0, Section 7.7) Figure 3-35. Messages Exchanged During the PQoS List PQoS Flow Transaction (MoCA 1.1, Figure 3-35. *See also* MoCA 2.0, Section 7.7)

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